



# caLIMS2

## Presentation to LS Composite Architecture Team: caLIMS2 Architecture

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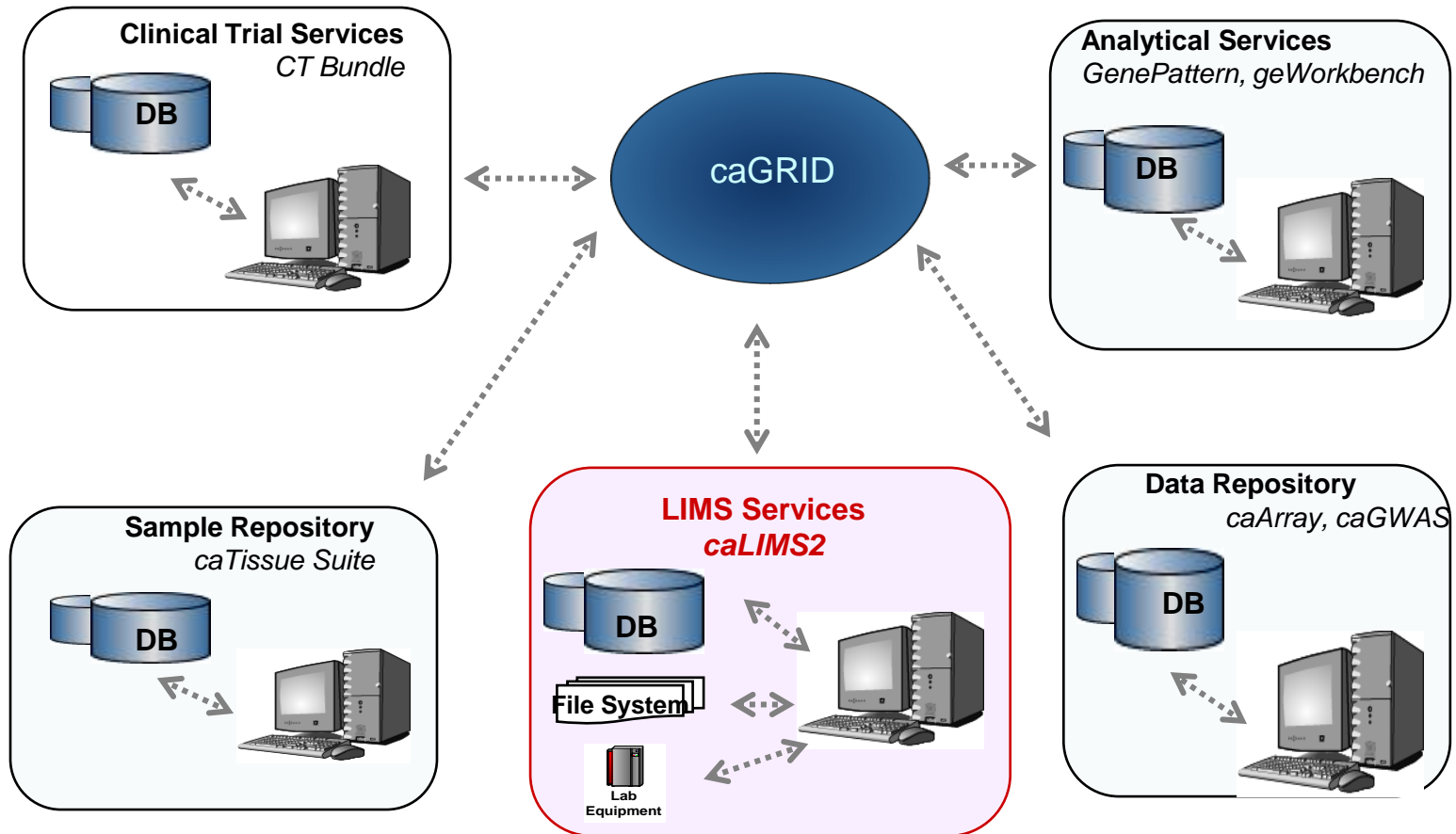
# Agenda

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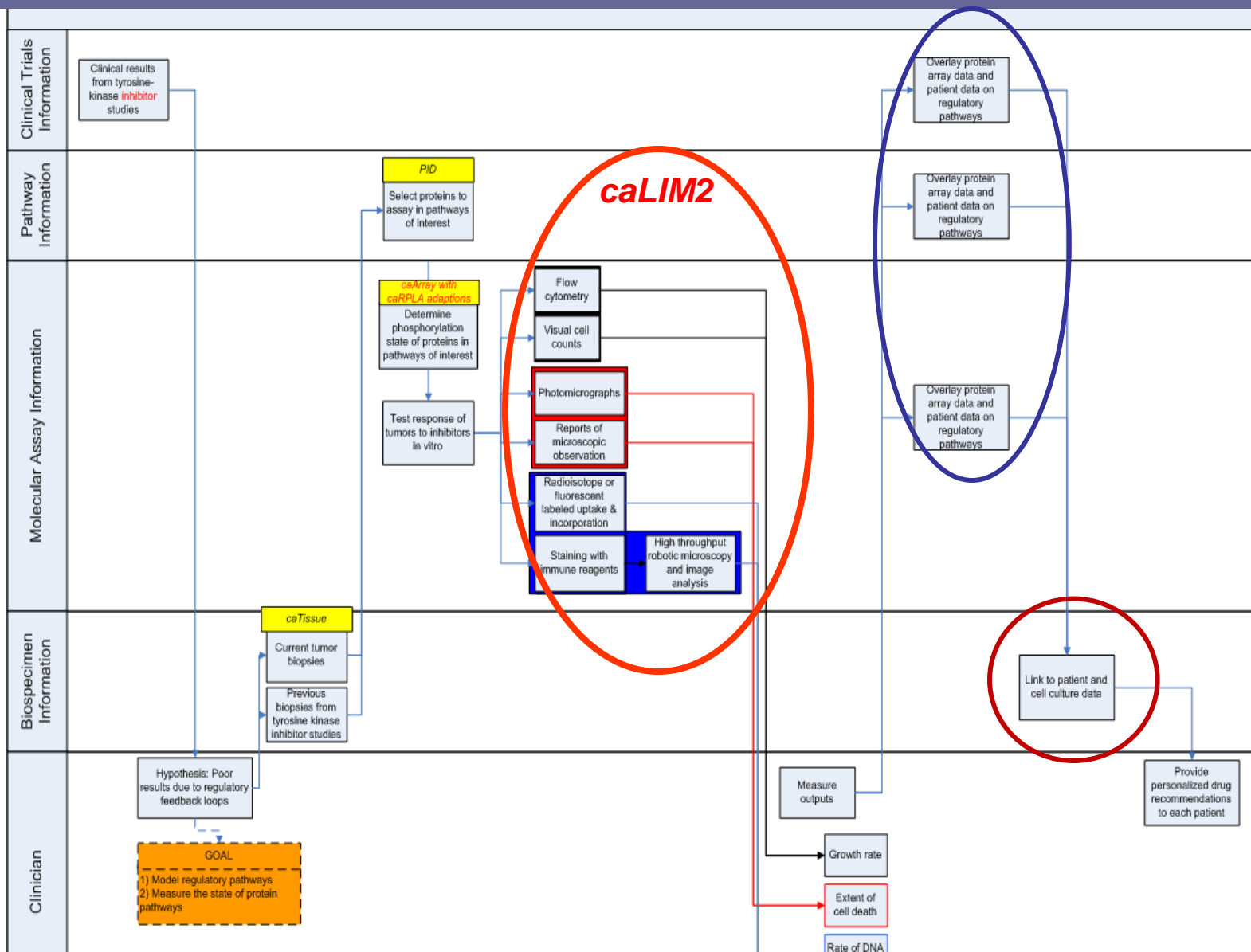
- ▶ The need for a caBIG<sup>®</sup> Compliant LIMS
- ▶ caLIMS2 Architecture: Overview
- ▶ caLIMS2 Architecture: Interfaces
- ▶ caLIMS2 Architecture: Integrating with caBIO, caTissue and caArray
- ▶ Pluggable services and UI
- ▶ Discussion and next steps

# A Need for a caBIG<sup>®</sup> Compliant LIMS

Life Science communities have identified the need for a caBIG<sup>®</sup> compliant laboratory information management system (LIMS)



# caLIMS2 in ICR Enterprise Use Case #8



# High Level caLIMS2 Use Case

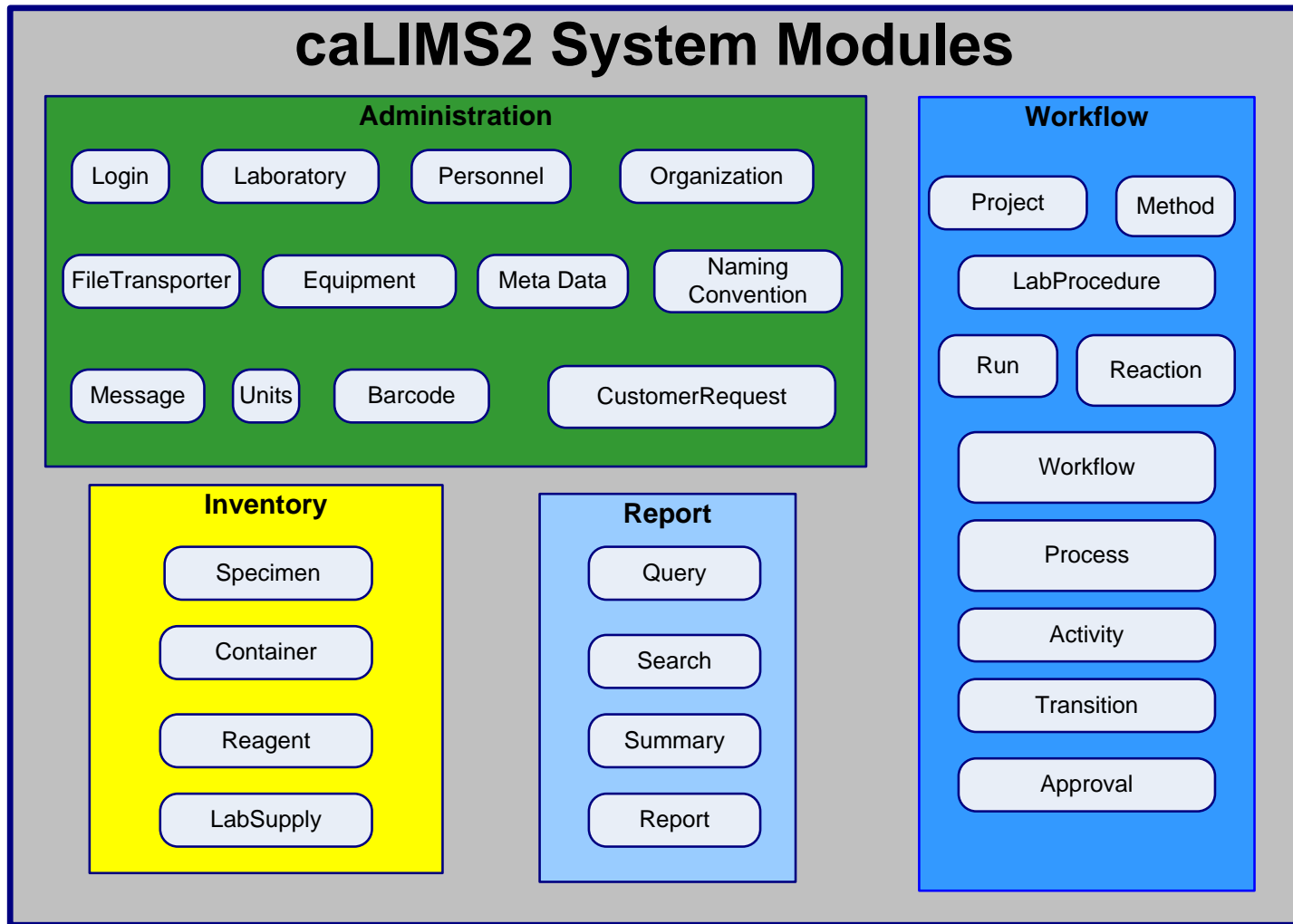
*An application is needed for recording and exchanging research laboratory experimental data and metadata.*

*This application should seamlessly integrate with caBIG<sup>®</sup> compliant specimen repositories, data portals, integrative services and analytical tools to facilitate translational research.*



caLIMS2

# caLIMS2 Core Modules



**Common classes:** Audit, Status, Type, Document, Notes, SOP, EnvironmentalCondition, Events, ExternalIdentifier, Safety, Scheduling.

# caLIMS2 Targeted Users

## Laboratory Types:

- ▶ Research laboratory
- ▶ Core laboratory facility
- ▶ Public health laboratory
- ▶ BIG-Health disease research laboratory

## Research Domains:

- ▶ Genomics
- ▶ Proteomics
- ▶ Nanotechnology

Basic system with adaptive workflow and generic experimental method framework allows flexibility to support current, new, and future technologies

# caLIMS2 Community: Early Adopters



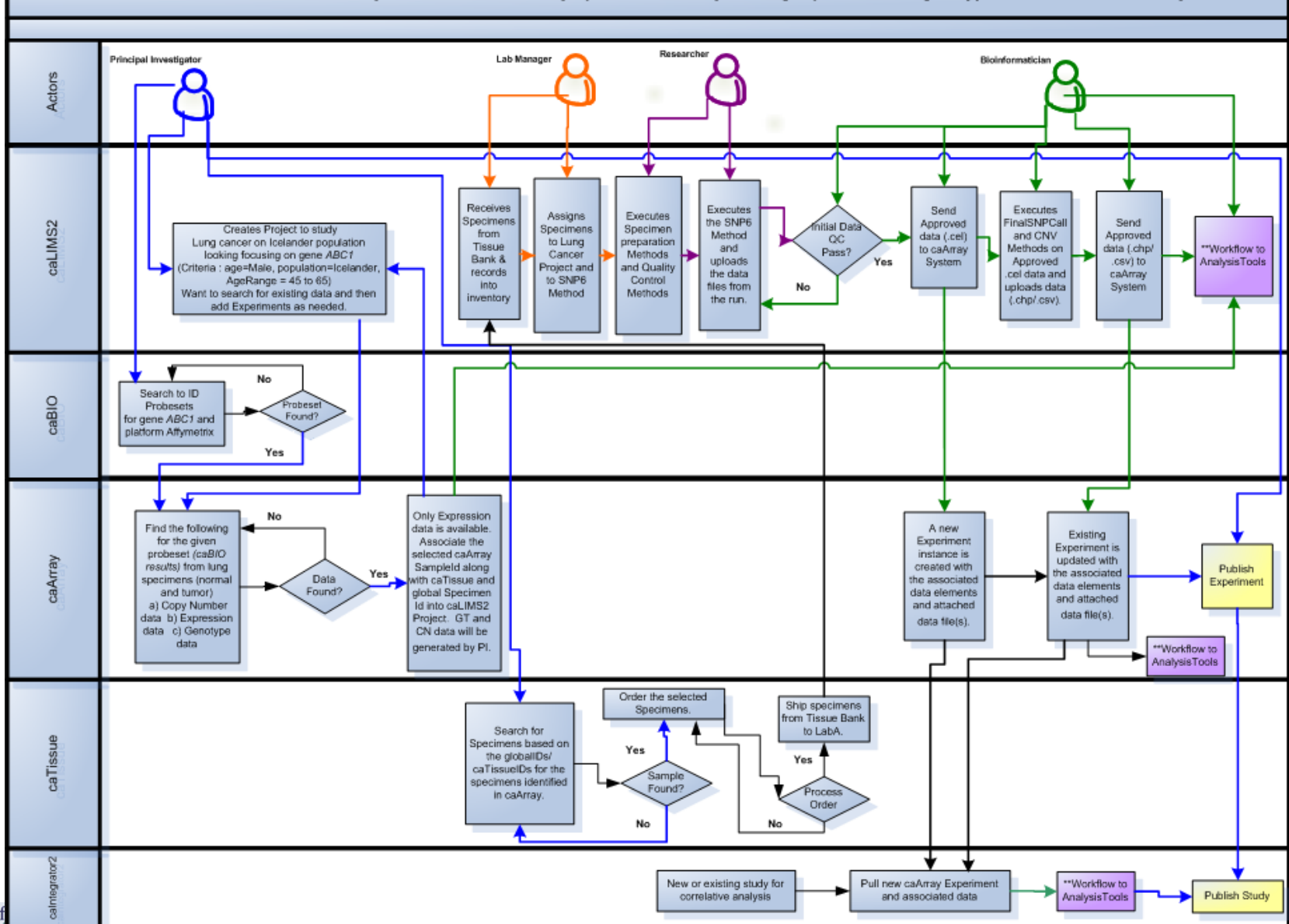


# caLIMS2 Architecture: Overview

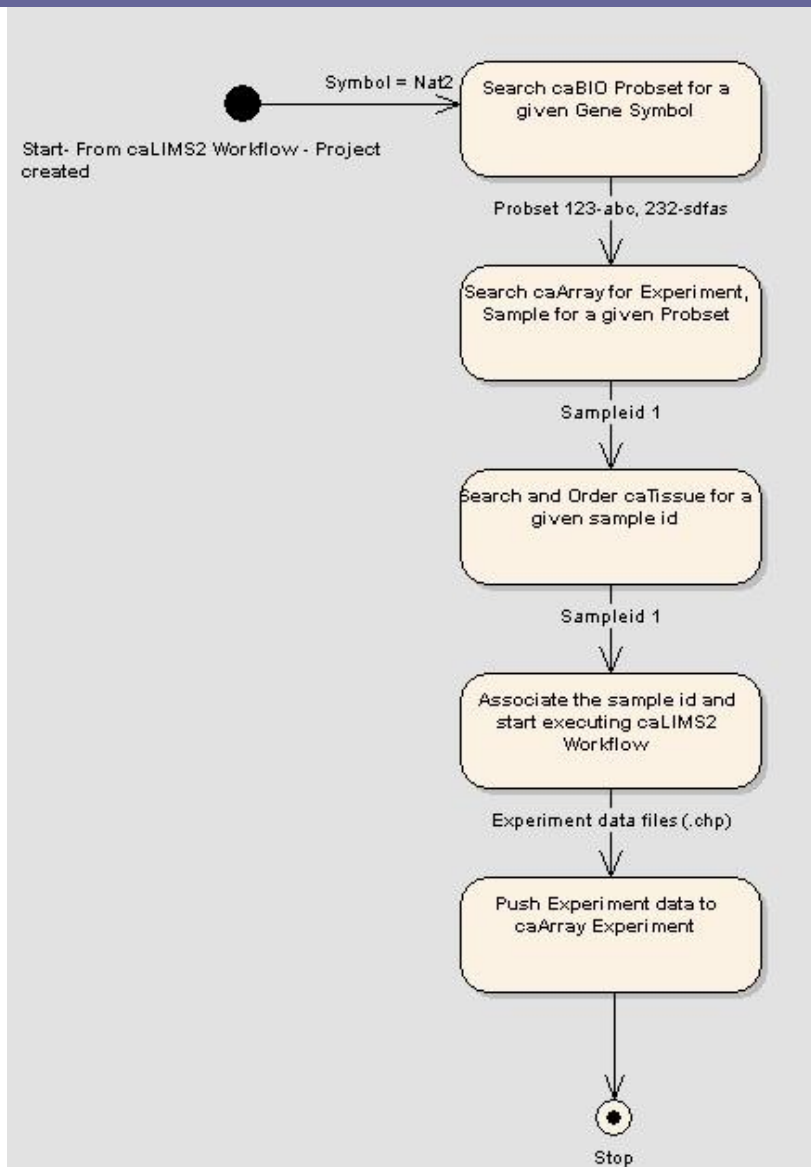
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# LS integration Use Case

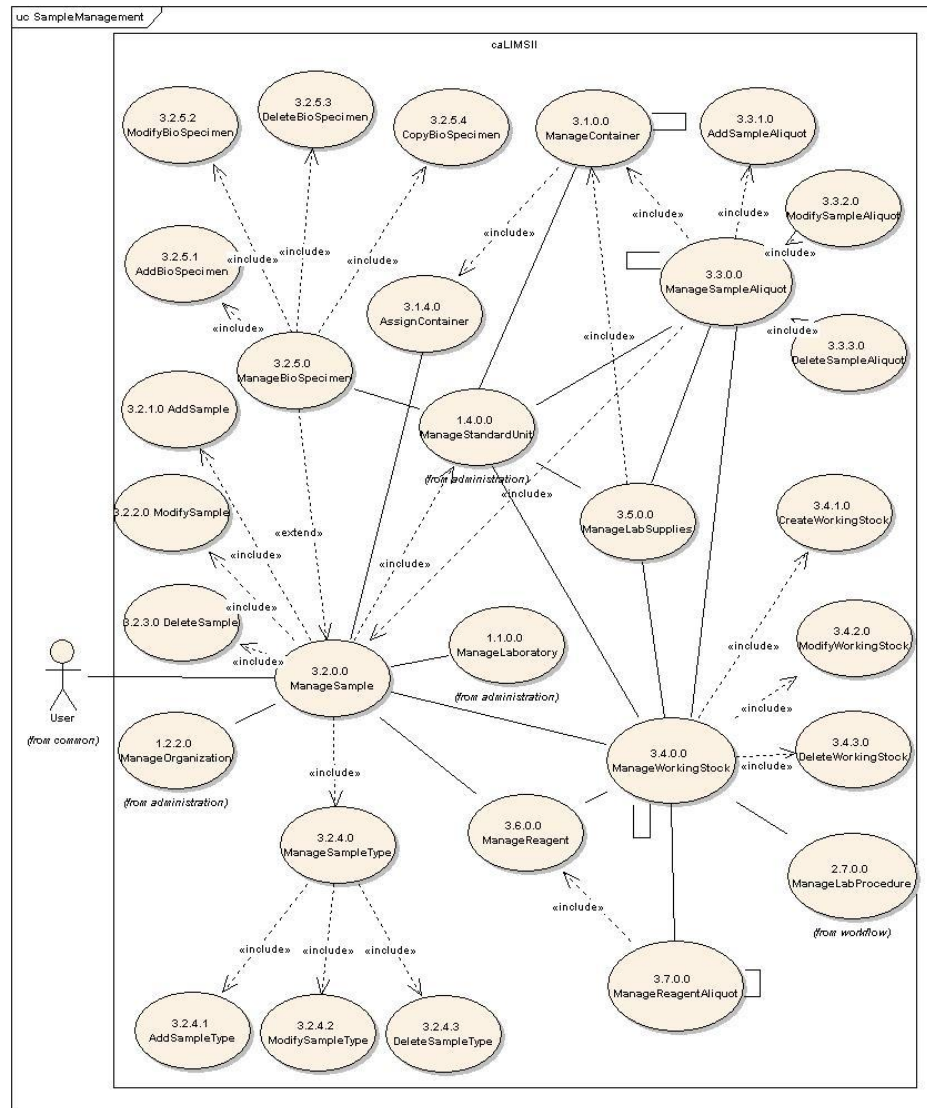
Scenario 1: Lab A uses information from caArray and caTissue to identify Specimens for Project using expression/CNV/genotype data for correlative analysis.



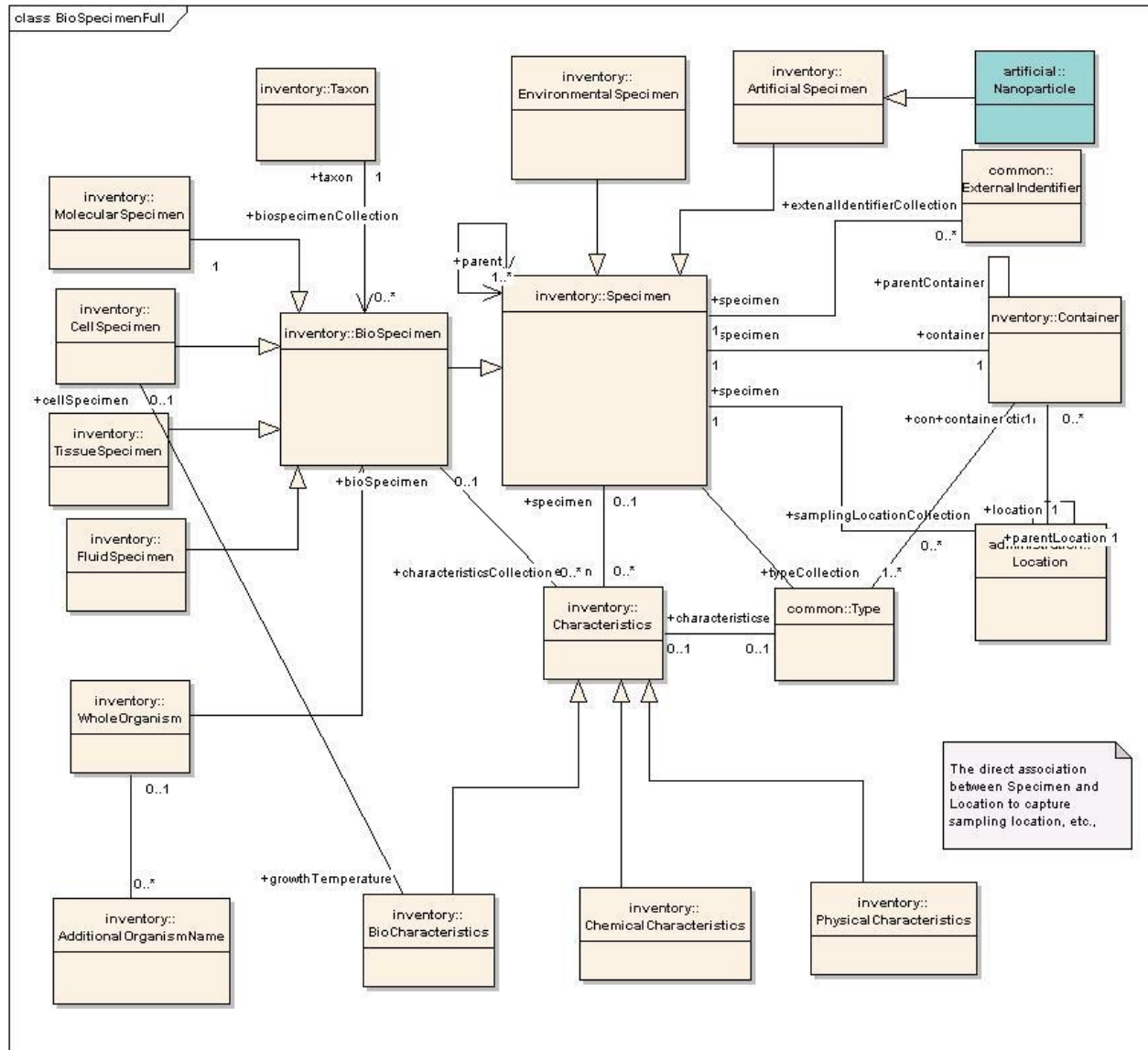
# Manage Sample Activity Diagram: an example scenario



# Use Case – Sample Management



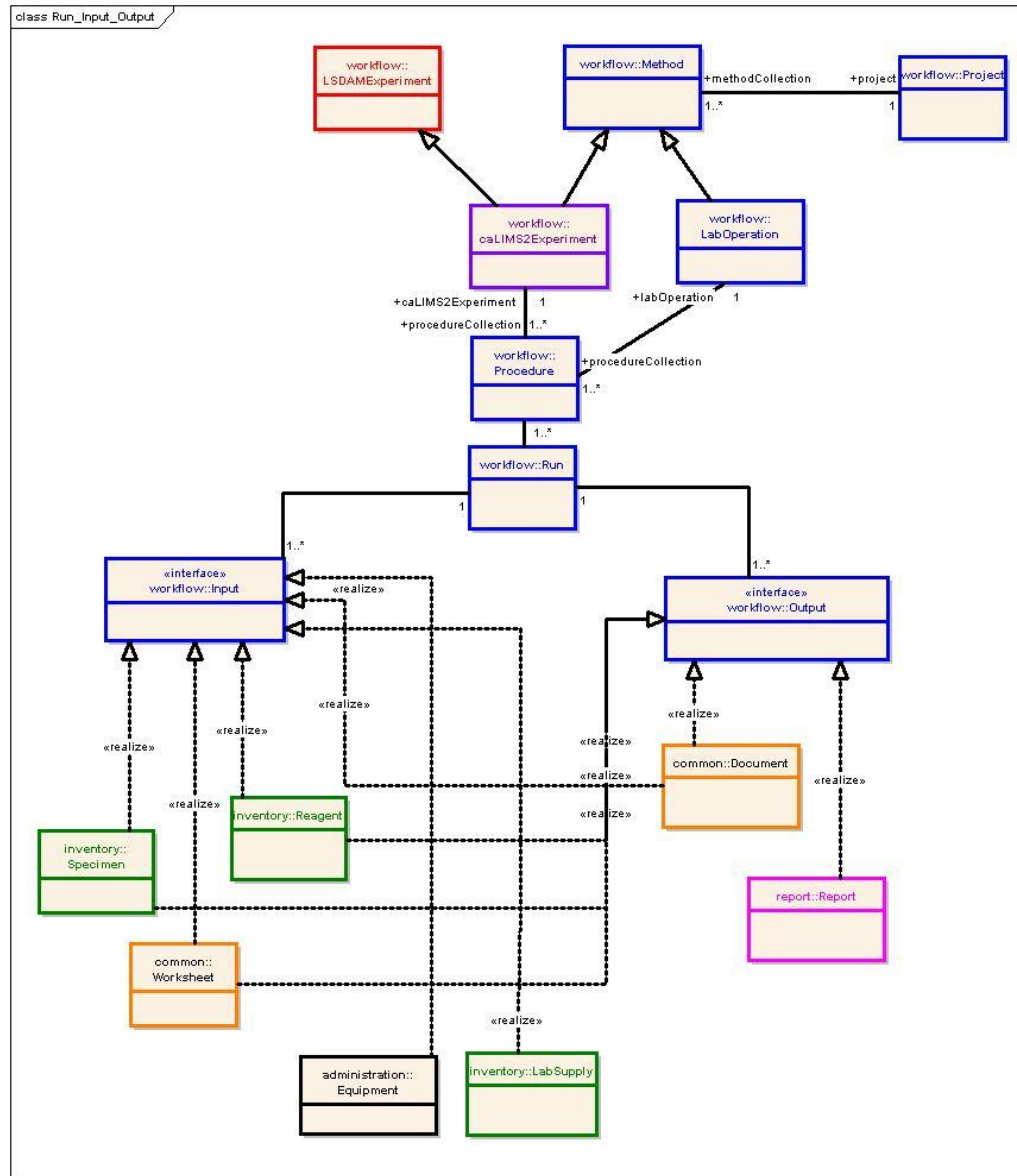
# Domain Model – Sample Management



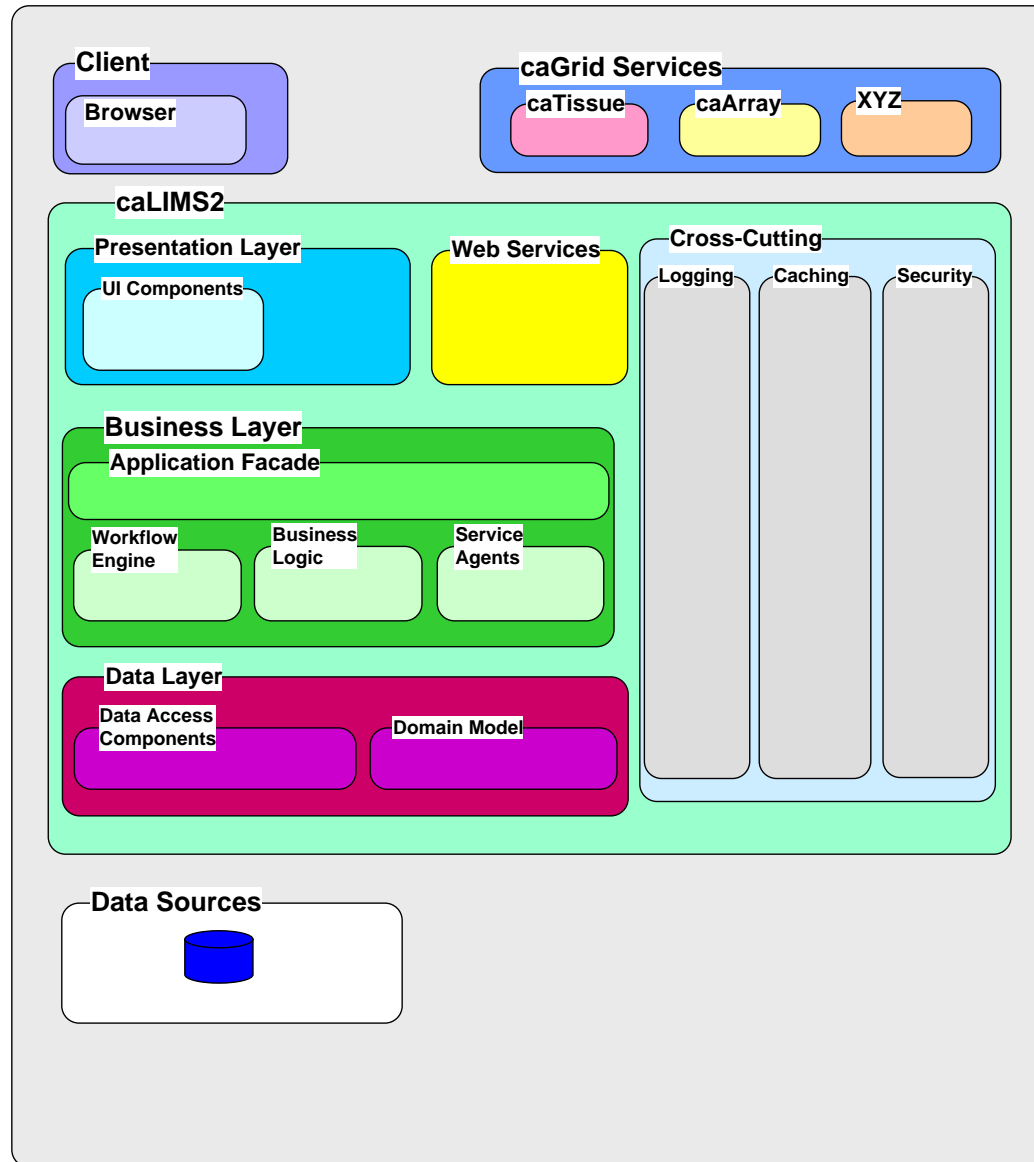
# **caLIMS2 Domain Model – harmonized with existing standards**

- 1) Example of our efforts to harmonize with existing standards  
example Organism, Person, additional ones such as  
Experiment, Specimen**
- 2) We worked with the community to come up with a generic  
Experiment model that is designed for current and future  
platforms.**
- 3) For instance caLIMS2 team is planning to work with caTissue  
team in tracking the processing of the primary specimens by  
reusing Experiment model.**

# caLIMS2 Information Models – Experiment

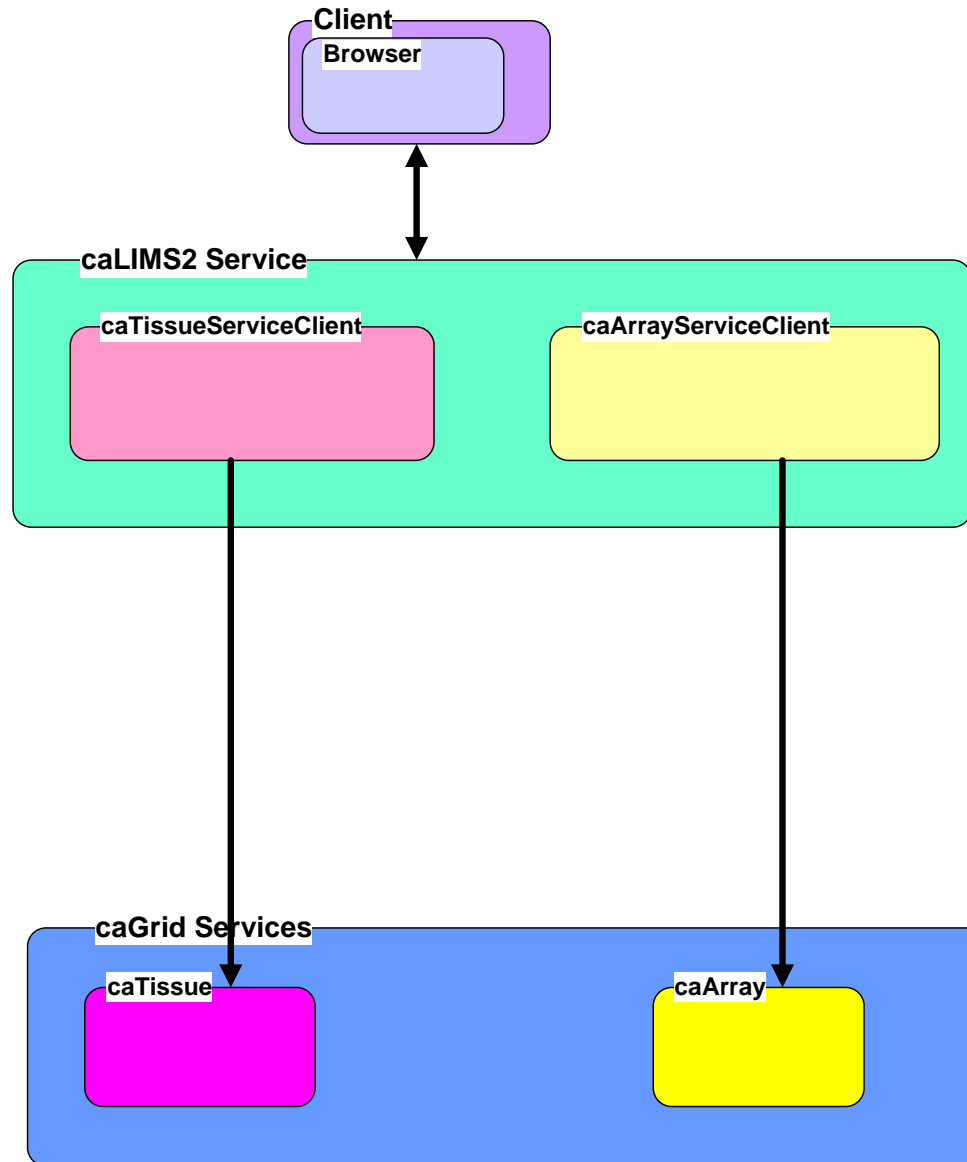


# caLIMS2: High Level Architecture



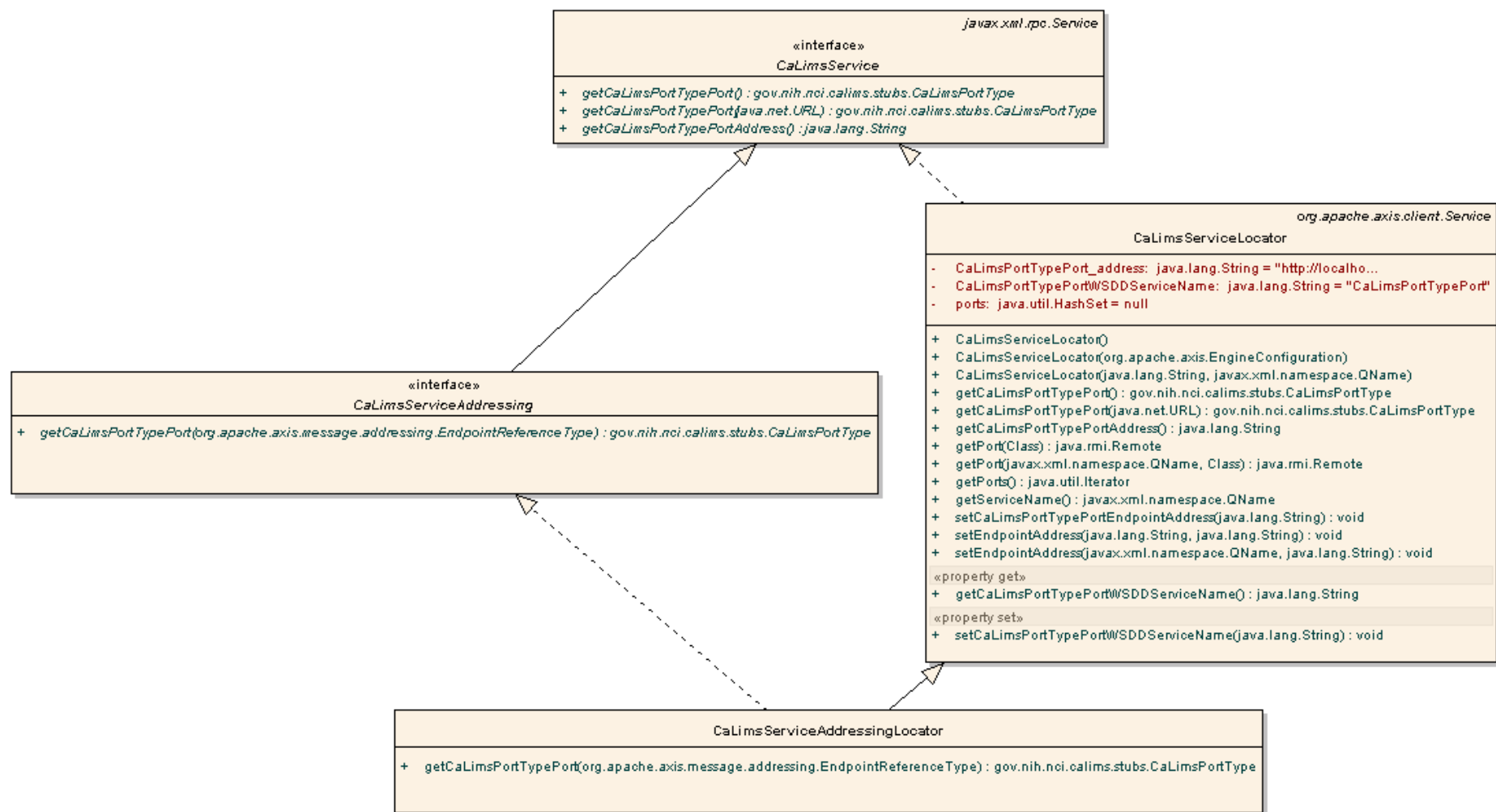


# caLIMS2 Architecture – service view



# caLIMS2: Mockup Service End Point

class service

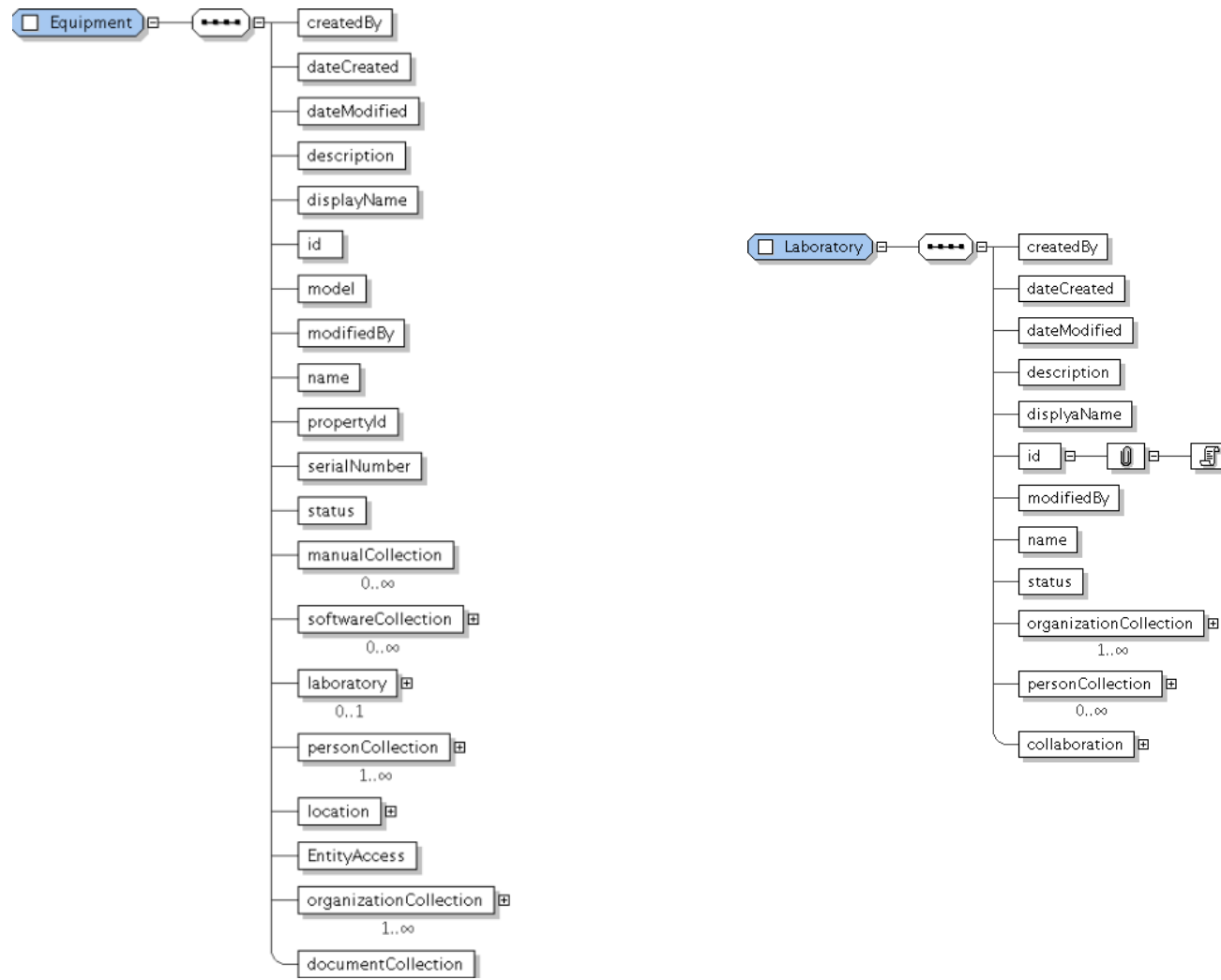


# Interface Control – Request / Response

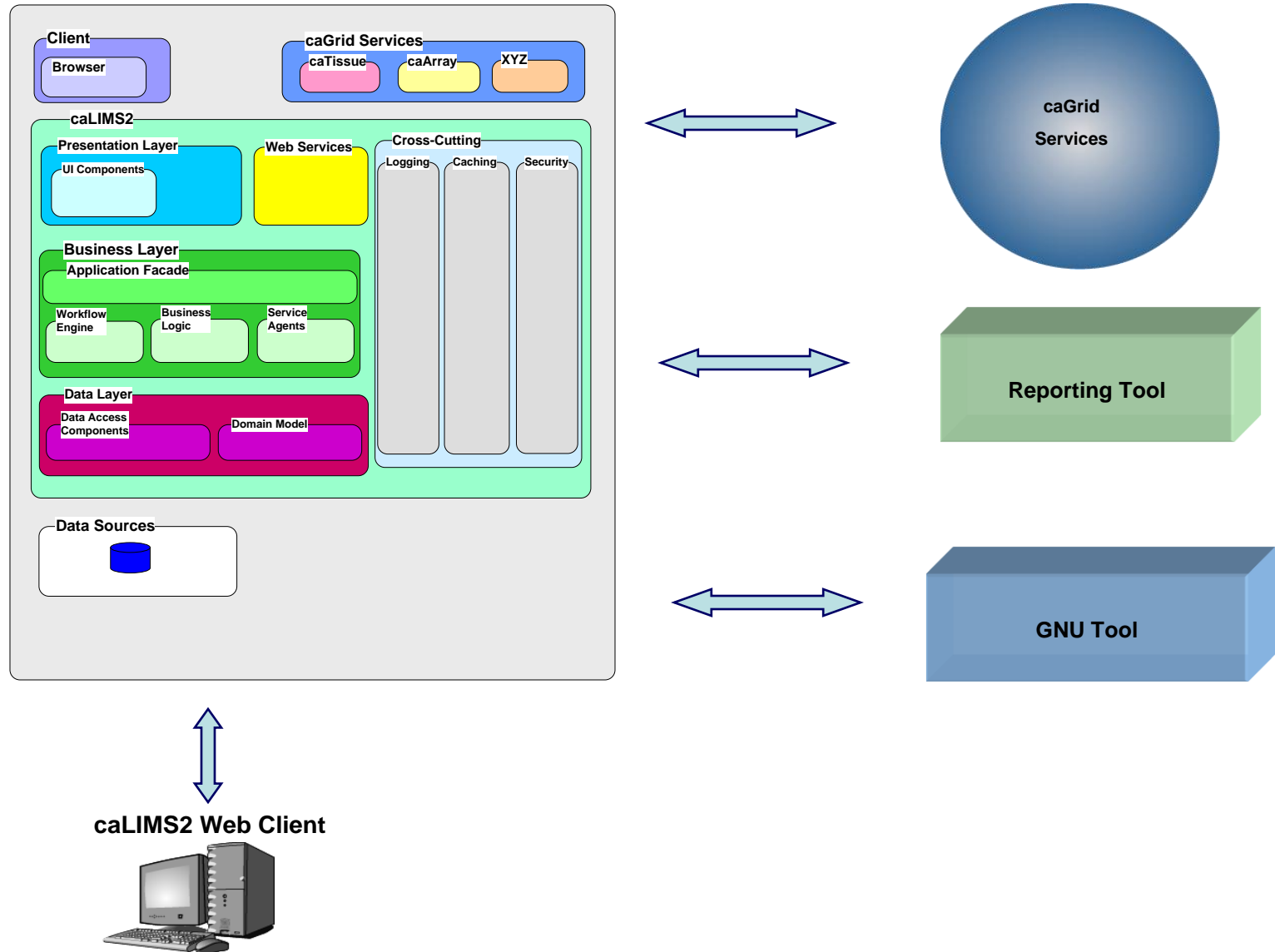
| GetEquipmentByldRequest  |  | <i>java.io.Serializable</i> |
|--|--|-----------------------------|
| <ul style="list-style-type: none"> <li>- <u>__equalsCalc</u>: java.lang.Object = null</li> <li>- <u>__hashCodeCalc</u>: boolean = false</li> <li>~ <u>elemField</u>: org.apache.axis.description.ElementDesc = new org.apache....</li> <li>- <u>integer</u>: java.math.BigInteger</li> <li>- <u>typeDesc</u>: org.apache.axis.description.TypeDesc = new org.apache....</li> </ul>   |  |                             |
| <ul style="list-style-type: none"> <li>+ <u>equals</u>(java.lang.Object): boolean</li> <li>+ <u>getDeserializer</u>(java.lang.String, java.lang.Class, javax.xml.namespace.QName): org.apache.axis.encoding.Deserializer</li> <li>+ <u>GetEquipmentByldRequest</u>()</li> <li>+ <u>GetEquipmentByldRequest</u>(java.math.BigInteger)</li> <li>+ <u>getInteger</u>(): java.math.BigInteger</li> <li>+ <u>getSerializer</u>(java.lang.String, java.lang.Class, javax.xml.namespace.QName): org.apache.axis.encoding.Serializer</li> <li>+ <u>getTypeDesc</u>(): org.apache.axis.description.TypeDesc</li> <li>+ <u>hashCode</u>(): int</li> <li>+ <u>setInteger</u>(java.math.BigInteger): void</li> </ul> |  |                             |

| GetEquipmentByldResponse   |  | <i>java.io.Serializable</i> |
|--|--|-----------------------------|
| <ul style="list-style-type: none"> <li>- <u>__equalsCalc</u>: java.lang.Object = null</li> <li>- <u>__hashCodeCalc</u>: boolean = false</li> <li>~ <u>elemField</u>: org.apache.axis.description.ElementDesc = new org.apache....</li> <li>- <u>equipment</u>: domain.Equipment</li> <li>- <u>typeDesc</u>: org.apache.axis.description.TypeDesc = new org.apache....</li> </ul>   |  |                             |
| <ul style="list-style-type: none"> <li>+ <u>equals</u>(java.lang.Object): boolean</li> <li>+ <u>getDeserializer</u>(java.lang.String, java.lang.Class, javax.xml.namespace.QName): org.apache.axis.encoding.Deserializer</li> <li>+ <u>getEquipment</u>(): domain.Equipment</li> <li>+ <u>GetEquipmentByldResponse</u>()</li> <li>+ <u>GetEquipmentByldResponse</u>(domain.Equipment)</li> <li>+ <u>getSerializer</u>(java.lang.String, java.lang.Class, javax.xml.namespace.QName): org.apache.axis.encoding.Serializer</li> <li>+ <u>getTypeDesc</u>(): org.apache.axis.description.TypeDesc</li> <li>+ <u>hashCode</u>(): int</li> <li>+ <u>setEquipment</u>(domain.Equipment): void</li> </ul> |  |                             |

# Equipment & Laboratory - Message Schema



# caLIMS2 Architecture: Interfaces



# caLIMS2: Design Artifacts

- Use case documents for each main module
- EA Use case diagrams
- EA Object Model
  - 0.5 M1 version
  - 1.0 version
- Additional diagrams and artifacts
- caLIMS2 Consortium Working Group notes and materials
- <http://gforge.nci.nih.gov/projects/calims2>

# Summary

- ▶ Discussed need for an Open Source caBIG® LIMS
- ▶ caLIMS2 Architecture
  - ▶ SOA, pluggable, easily extendable
- ▶ caLIMS2 Touch-points (version 1.0)
  - ▶ caLIMS2-caBIO (search by gene symbol/probeset)
  - ▶ caLIMS2-caTissue (search for specimen name, type, etc.)
  - ▶ caLIMS2-caArray (search for Experiment, platform, probeset)

# Discussion and next steps

## Project Communication

caLIMS2 project site:

[caLIMS2 Wiki Home page](#)

<http://gforge.nci.nih.gov/projects/calims2>

CBIIT LIMS Consortium LISTSERV:

<https://list.nih.gov/archives/nci-lims-consortium.html>

Web based design artifacts

<http://lpgws.nci.nih.gov/calims2/index.htm>

## Contacts:

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